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FACSIMILE COVER SHEET

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): DIMITROVA et al.

Application No.: 09/866,394

Filing Date: May 25, 2001

Title: COMPACT VISUAL SUMMARIES USING SUPERHISTOGRAMS AND FRAME SIGNATURES
Examiner: TING ZHOU.

Art Unit: 2173

Docket No.: US010265

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Reply Brief (11)

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Yuri Kateshov, Esq.
Date: December 16, 2005
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REPLY BRIEF

SIR:

    This Reply Brief is being filed under 37 C.F.R. §41.41(1)(a) to address arguments presented in the Examiner's Answer (the EA) mailed on October 21, 2005 in response to the Appeal Brief filed on July 28, 2005.

    In section 9 of the Examiner's Answer, the Examiner reiterates his rejection of appealed claims 1-5, 7-15, 17-24, 26-33 and 35-38 over the article entitled "Color SuperHistograms for Video Representation" by Dimitrova (Dimitrova) in view of U.S. Patent 5,805,733 to Wang (Wang). Appellants respectfully disagree.

    Referring to Wang on page 4 of the EA, the Examiner asserts that

> "Wang et al. further teach selecting representative keyframe images from each group of related *scenes* to create a compact visual summary of the video material (summarizing a video sequence by taking one representative frame from each set of related scenes with similar average color histograms, to represent the set to enable the user to view a larger sampling of video sequence images) (Wang et al.: column 1, lines 51-67 and column 2, lines 1-24)"

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Based on the above quoted passage, the Examiner concludes that a combination of Wang and Dimitrova teaches that

> "*the representative images include at least one of the first image in each family histogram, the most meaningful image in each superhistogram, a randomly chosen image and an image that is closest to the cluster center*" (Wang et al; column 3, lines 37-66)", as recited in each of appealed independent claims 1, 11, 21, and 30.

The Examiner is incorrect, at least partly, with all due respect for the following reasons.

Wang teaches extracting a sequence of frame signatures F and generating a color histogram for each frame F. Using a simple computation technique, Wang teaches identifying a first and last frame histogram for each scene M. Finally, the time duration of each scene M is determined "from difference in frame numbers between the first and last frames of a scene." See Wang column 4, lines 9-35.

The term "scene" used by Wang corresponds to the term "family histogram" as disclosed by Dimitrova. See Dimitrova, page 314, right column, first full paragraph. The appealed claims use the same terminology as Dimitrova.

Having identified a plurality of scenes, column 3, lines 52-64 of Wang further discloses "consolidating the video sequence into a small number of scenes" or sets, each of which corresponds to Dimitrova's 'superhistogram.' *Id.*

To select representative keyframe images, Wang suggests selecting

1. "the temporarily medial scene in the set (*superhistogram*)"; See Wang, column 3, line 57-59 and column 6, lines 15-17; or

2. "the longest scene (*family histogram*)". See Wang, columns 3:59-62 and 6; 17-19. (emphasis added)

In contrast, each independent claim 1, 11, 21, and 30 of the present invention recites the representative images "*include at least one of (1) the first image in each family histogram, ... (3) a randomly chosen image.*" Consequently, the combination of references, as cited by the Examiner, neither teaches nor suggests selecting a representative image by using one of the (1) and (3) techniques, as recited in appealed independent claims 1, 11, 21 and 30.

Appellants, thus, propose to amend independent claims 1, 11, 21 and 30 as indicated in Proposed Claim Appendix. Briefly, each of the independent claims, as amended, recites that

the representative images include at least one of (1) the first image in each family histogram, (2) the most meaningful image in each superhistogram, (2) and a randomly chosen image (3) and an image that is closest to the cluster center"

In addition, Appellants propose to add dependent claims reciting the subject matter removed from each independent claim.

CONCLUSION

Based on all of the above, withdrawal of the final rejection is respectfully solicited. Note that no new issue has been introduced into appealed claims as proposed, and, therefore, no new search is needed.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

No additional fees are presently required.

Respectfully submitted,

By _____

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Dated: December 16, 2005

PROPOSED CLAIM APPENDIX

1.   (Currently Amended) For use in a system (100) capable of creating visual summaries of video material, an apparatus (130, 200) for creating a compact visual summary of video material, said apparatus (130, 200) comprising:

a visual summary controller (130, 200) capable of receiving keyframes of said video material;

wherein said visual summary controller (130, 200) is capable of extracting frame signatures from said keyframes, and capable of using said frame signatures to create superhistograms from said keyframes, and capable of using said frame signatures and said superhistograms to select representative keyframe images for each superhistogram to create a compact visual summary of said video material,

wherein said representative images include at least one of (1) the first image in each family histogram, (2) the most meaningful image in each superhistogram, (3) and a randomly chosen image, and (4) an image that is closest to the cluster center.

2.   (Original) The apparatus (130, 200) as claimed in Claim 1 wherein said visual summary controller (130, 200) is capable of filtering said keyframes and extracting frame signatures from said filtered keyframes before using said frame signatures to create said superhistograms to create a compact visual summary of said video material.

3.   (Original) The apparatus (130, 200) as claimed in Claim 2 wherein said visual summary controller (130, 200) is capable of creating said compact visual summary of said video material by using said superhistograms to cluster said filtered keyframes, and by adding a representative keyframe from said clustered keyframes to said compact visual summary of said video material.

4.   (Original) The apparatus (130, 200) as claimed in Claim 2 wherein said frame signature is a histogram.

5.   (Original) The apparatus (130, 200) as claimed in Claim 3 wherein the distance measure for clustering is equal to a histogram difference calculated by one of: L1 distance measure

method, L2 distance measure method, histogram intersection method, Chi Square test method, and bin-wise histogram intersection method.

6.   (Cancelled)

7.   (Original) The apparatus (130, 200) as claimed in Claim 5 wherein said visual summary controller (130, 200) is capable of selecting a family histogram to use to create said compact visual summary of said video material.

8.   (Original) The apparatus (130, 200) as claimed in Claim 1 wherein said visual summary controller (130, 200) further comprises:
a visual summary retrieval module (180) capable of retrieving a compact visual summary stored in a memory unit (120) and causing said compact visual summary to be displayed in response to a user request.

9.   (Original) The apparatus (130, 200) as claimed in Claim 3 wherein said visual summary controller (130, 200) is capable of using said compact visual summary to access at least one portion of said video material.

10.   (Original) The apparatus (130, 200) as claimed in Claim 3 wherein said visual summary controller (130, 200) is capable of using said compact visual summary to create new video material.

11.   (Currently amended) A system (100) capable of creating visual summaries of video material, said system (100) comprising an apparatus (130, 200) for creating a compact visual summary of video material, said apparatus (130, 200) comprising:
        a visual summary controller (130, 200) capable of receiving keyframes of said video material;
        wherein said visual summary controller (130, 200) is capable of extracting frame

signatures from said keyframes, and capable of using said frame signatures to create superhistograms from said keyframes, and capable of using said frame signatures and said superhistograms to select representative keyframe images for each superhistogram to create a compact visual summary of said video material ,

wherein said representative images include at least one of (1) the first image in each family histogram, (2) the most meaningful image in each superhistogram, (3) and a randomly chosen image, and (4) an image that is closest to the cluster center.

.

12. (Original) The system (100) as claimed in Claim 11 wherein said visual summary controller (130, 200) is capable of filtering said keyframes and extracting frame signatures from said filtered keyframes before using said frame signatures to create said superhistograms to create a compact visual summary of said video material.

13. (Original) The system (100) as claimed in Claim 12 wherein said visual summary controller (130, 200) is capable of creating said compact visual summary of said video material by using said superhistograms to cluster said filtered keyframes, and by adding a representative keyframe from said clustered keyframes to said compact visual summary of said video material.

14. (Original) The system (100) as claimed in Claim 12 wherein said frame signature is a histogram.

15. (Original) The system (100) as claimed in Claim 13 wherein the distance measure for clustering is equal to a histogram difference calculated by one of: L1 distance measure method, L2 distance measure method, histogram intersection method, Chi Square test method, and bin-wise histogram intersection method.

16. (Cancelled)

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30.   (Currently amended) For use in a system (100) capable of creating visual summaries of video material, computer-executable instructions stored on a computer-readable storage medium (125) for creating a compact visual summary of video material, the computer-executable instructions comprising the steps of:

receiving in a visual summary controller (130, 200) keyframes of said video material;
extracting frame signatures from said keyframes;

using said frame signatures to create superhistograms from said keyframes; and
using said frame signatures and said superhistograms to select representative keyframe images for each superhistogram to create a compact visual summary of said video material,

wherein said representative images include at least one of ~~(1)~~ the first image in each family histogram, ~~(2) the most meaningful image in each superhistogram, (3)~~ and a randomly chosen image~~, and (4) an image that is closest to the cluster center~~.

31.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 30 further comprising the step of:
filtering said keyframes received in said visual summary controller (130, 200); and
extracting frame signatures from said filtered keyframes before using said frame signatures to create said superhistograms to create a compact visual summary of said video material.

32.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 31 further comprising the steps of:
using said histograms to cluster said filtered keyframes; and
adding a representative keyframe from said clustered keyframes to said compact visual summary of said video material.

33.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 32 wherein the distance measure for clustering is equal to a histogram difference calculated by one of: L1 distance measure method, L2 distance measure method, histogram intersection method, Chi Square test method, and bin-wise histogram intersection method.

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34.   (Cancelled)

35.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 34 further comprising the step of:

selecting a family histogram to use to create said compact visual summary of said video material.

36.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 30 further comprising the steps of:

retrieving a compact visual summary stored in a memory unit (120);

and causing said compact visual summary to be displayed in response to a user request.

37.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 32 further comprising the step of:

causing said visual summary controller (130, 200) to use said compact visual summary to access at least one portion of said video material.

38.   (Original) The computer-executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 32 further comprising the step of:

causing said visual summary controller (130, 200) to use said compact visual summary to create new video material

39.   (new) The apparatus (130, 200) as claimed in Claim 1, wherein said representative images further include ay least one of the most meaningful image in each superhistogram and an image that is closest to the cluster center.

40.   (new) The system (100) as claimed in Claim 11, wherein said representative images further include ay least one of the most meaningful image in each superhistogram and an image that is closest to the cluster center.

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41.   (new) The method as claimed in Claim 21, wherein said representative images further include ay least one of the most meaningful image in each superhistogram and an image that is closest to the cluster center.

42.   (new) The computer executable instructions stored on a computer-readable storage medium (125) as claimed in Claim 30, wherein said representative images further include ay least one of the most meaningful image in each superhistogram and an image that is closest to the cluster center.